U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: **ACTION:** Elevated Chloride Levels in SikaGrout® 300PT Cementitious Grout

Date: February 10,2012

/s/ Original Signed by
From: John Baxter
Associate Administrator for Infrastructure

In Reply Refer To:
HIBT-10

To: Directors of Field Services
Division Administrators

Our memorandum of November 23, 2011, initially described potentially elevated chloride levels in SikaGrout 300 PT cementious grout and provided relevant background and descriptive information. Since distributing that memorandum, several efforts have been initiated to support addressing this issue. The purpose of this memorandum is to (1) update you on the status of our evaluation of the varying levels of chloride found in SikaGrout 300 PT Grout produced at the Marion, Ohio, plant between November 2002 and March 2010, (2) provide interim guidance on how to increase assurance that this issue will not occur again in the near future, and (3) to ask for assistance in developing information on structures possibly affected and coordinating our actions.

Research has been initiated at the FHWA Turner-Fairbank Highway Research Center to study the effect of chloride contaminated grout on the long-term performance of prestressing strand. This laboratory study is intended to produce the information necessary for FHWA to provide further advice to bridge owners who are affected by the chloride issue. While interim results may be available sooner, the study is currently scheduled to be completed by the end of the calendar year.

FHWA has been coordinating with the Post-Tensioning Institute (PTI) on making changes to their specifications for both on-site mixed grout and prepackaged grout that will increase assurance that appropriate quality materials are used on future projects. The new Third Edition of the PTI Specification for Grouting of Post-Tensioned Structures that incorporates these changes is expected to be available by early April of this year. In the interim, until that revised specification is issued, for all new projects that include post-tensioned applications FHWA strongly recommends that wet samples collected from grout trial batches be tested for chloride levels per ASTM C1152 *Standard Test Method for Acid-Soluble Chlorides in Mortar and Concrete*. This test should be

performed at least once for every manufactured lot (typically one truck load or 40,000 lbs) of grout to be used. Without newer information, acceptance of the grout should continue to be based on the AASHTO and PTI recognized Cl-ion limit of 0.08% by weight of cementitious material.

In addition, to the extent practical, FHWA recommends that for on-going projects that include post-tensioned applications that grout trial batches be similarly tested for chlorides.

To promote a more consistent and better understanding of the issues and the new specifications, FHWA will be hosting a Webinar on these topics soon after the revised PTI specifications are available. Invitations to participate in the Webinar will be extended to the State DOTs through AASHTO. Immediately prior to the Webinar, through its Division Offices, FHWA intends to provide a copy of the revised PTI specifications to the State DOTs for their use and to prepare for the training.

Since November 2011, FHWA has continued to work with Sika, its engineering representative and our partners in the State DOTs to better define the extent of the issue. Table 1 presents an updated list of the bridge projects identified to date which received 300 PT grout from the Marion Plant. This is a working list and will continue to be updated as better information is developed. As stated in our previous Memorandum, the grout delivered for use on these projects may or may not contain levels of chlorides above the specified limit. Sika's engineering representative has contacted most of the owners of these projects and has begun sampling the grout used in order to establish which lots of grout are indeed affected, to what extent, and, by extension, which bridges will need additional attention.

Finally, it is recognized that many of the projects listed in Table 1 contain several structures that are individually coded for the National Bridge Inventory (NBI). In order to better manage and focus our efforts, I am asking that you work with your corresponding State DOT to assemble the following information for each potentially affected structure in those projects.

- Project Name
- Structure Number (NBI Item 8)
- Detail the location and describe the individual structure
- Provide a description of all post-tensioned application on the structure
- Identify whether tendons are internal or external to the concrete section, or both
- Confirm, if possible, that grout used was produced at Sika plant in Marion, OH between November 2002 and March 2010
- Identify if construction funding source was Federal, State, local, other or a combination

Also, if your State DOT has identified structures from other projects that are not represented by those listed in Table 1, we are interested in collecting the same information on those bridges. Once compiled, please submit this information to Reggie Holt, Concrete Bridge Specialist, FHWA Office of Bridge Technology by February 29, 2012. Reggie can be reached at Reggie.Holt@dot.gov or (202)366-4596.

Please share this information with your corresponding State DOT and inform them of the recommendations contained herein. Also, please ask your State DOT to share the information and recommendations with local owners of bridges that are included in the listed projects. We will provide additional updates as significant information becomes available. Until then, for additional information, please contact Myint Lwin, Director, Office of Bridge Technology, at (202)366-4589.

cc:
HOA-1
HOA-2

Table 1. Bridge projects with possible elevated chloride grout.

Project	State
Intersection 55 & 405 Freeway	CA
Big Cypress	FL
Garcon Point Bridge	FL
I-75/I-595 Interchange	FL
1259 South Loop Road	GA
SR316 Jobsite on I-85 North	GA
I-355 Extension Bridge	IL
Kishwaukee River Bridge	IL
I-65 & I-80 Toll Road	IN
Edgemoor Bridge	KS
Kentucky 22 over KY River	KY
Hemlock Brook Bridge	MA
Woodrow Wilson Bridge	MD/VA
Crosstown Project	MN
I-35W Bridge	MN
Wakota Bridge	MN
Junction of RA and 64 Highway	MO
US Highway 90	MS
Martin County Bridge over Smithwick	NC
4 Bears Bridge	ND
Bayonne Bridge	NJ
Trenton Morrisville Bridge	NJ
Victory Bridge	NJ
Fulton Street Bridge	OH
I-270 SR 161	OH
Intersection of SR266 & SR513	OH
High Street Bridge	OH
Maumee River Crossing	OH
Allegheny River Bridge	PA
Denbo (Mon Fayette) Bridge	PA
Susquehanna Bridge	PA
Highway 133 & 87 Intersection	SC
Cooper River Bridge	SC
Carbon Plant Road over IH 37	TX
Pomeroy-Mason Bridge	WV/OH

U.S. Department of Transportation
Federal Highway Administration

Memorandum

Subject: ACTION: Elevated Chloride Levels in SikaGrout® 300 PT Cementitious Grout

Date: November 23, 2011

From: King W. Gee
Associate Administrator
Office of Infrastructure

In Reply Refer To:
HIBT-1

To: Division Administrators
Directors of Field Services

The purpose of this memorandum is to inform you of an issue pertaining to varying levels of chloride found in grout used to fill tendon ducts in post-tensioned construction. The grout, SikaGrout® 300 PT, is a non-shrink, low-bleed cementitious material used to create a composite connection and provide a mechanical barrier between the high-strength steel strand tendons and infiltrating chlorides and water that may cause corrosion.

On October 26th , Sika informed FHWA that their 300 PT grout produced from November 2002 until March 2010 at the Sika plant in Marion, Ohio, contained significantly varying levels of chloride. These chloride levels ranged from being less than the specified limit of 0.08 percent by weight of cementitious material, to as much as 400 percent above that limit. This chloride limit is established by the AASHTO LRFD Bridge Construction Specifications (Table 10.9.3-2), is supported by FHWA and by concrete bridge industry organizations, and is asserted by Sika to be the limit for their 300 PT grout.

Sika has ceased the production of the 300 PT grout at the Marion Plant and is in the process of determining which batch lots of grout contained chlorides above the specified limit and what bridges might be affected. The Marion Plant produced 20,327,300 lbs. of this product from November 2002 to March 2010 with approximately 16,000,000 lbs of the grout used in bridge project post-tensioning applications. The attached table presents the bridge projects identified to date which received 300 PT grout from the Marion Plant. This is a working list - individual bridges will be added and subtracted as we discover more details about these and other projects.

The grout delivered for use on these projects may or may not contain levels of chlorides above the specified limit. Sika or their representative has approached most of the owners of these bridges to explain the situation and to arrange to conduct examinations of specific structures in order to determine if chlorides are present and at what level. In addition to

providing information on the condition of the bridge, these examinations will also help define which batch lots contained elevated levels of chlorides and, by extension, confirm the individual projects affected.

The existence of elevated chlorides in post-tensioning systems is not an immediate safety concern. While the existence of chlorides does not indicate corrosion, the existence does indicate increased corrosion potential. This type of concrete bridge construction is typically redundant, incorporating many tendons or alternate load paths that can overcome the unanticipated loss of one or more tendons. This has been demonstrated by bridges that have experienced a loss of post-tensioning force due to tendon corrosion and have performed adequately until the issue was identified and repaired. In addition, in these cases, this loss in force manifested itself as observable distress before becoming a significant safety concern.

The chloride content threshold in the affected grout is dependent on many factors and, as a result, is not very well understood. The FHWA is in the process of planning research to better define acceptable levels of chloride in post-tensioning tendon systems. This research is intended to provide FHWA with adequate information to support sufficient oversight of remedies that Sika proposes to bridge owners, and to assist bridge owners in making sound decisions if they encounter tendons with chloride levels above the specified level. It is anticipated that this research will begin soon and produce preliminary results in less than a year.

The FHWA will be working through its division offices to support the affected bridge owners and to ensure that the appropriate measures to address any short- or longer-term concerns are taken. In addition, FHWA intends to work with the AASHTO Subcommittee on Materials, the AASHTO Subcommittee on Bridges and Structures, and concrete bridge industry organizations to develop standard provisions that would prevent concerns of this nature in future bridge construction.

Please share this information with your corresponding State DOT. Other than that, no action is required at this time. Once the extent of the issue is better defined, we may forward additional information that will help bridge owners develop appropriate long-term solutions. Until then, for additional information, please contact Myint Lwin, Director, Office of Bridge Technology, at (202)366-4589.

Attachment

Table. Bridge projects with possible elevated chloride grout.

Bridge Project	State
Intersection 55 & 405 Freeway	CA
Big Cypress	FL
Garcon Point Bridge	FL
I-75/I-595 Interchange	FL
1259 South Loop Road	GA
I-285 Structures	GA
SR316 Jobsite on I-85 North	GA
I-355 Extension Bridge	IL
Flyover Bridge at Indianapolis Airport	IN
I-65 & I-80 Toll Road	IN
Edgemoor Bridge	KS
Hancock Brook Bridge	MA
Woodrow Wilson Bridge	MD/VA
Crosstown Project	MN
I-35W Bridge	MN
Wakota Bridge	MN
Junction of RA and 64 Highway	MO
US Highway 90	MS
US Highway 91	MS
Martin County Bridge over Smithwick	NC
4 Bears Bridge	ND
Bayonne Bridge	NJ
Trenton Morrisville Bridge	NJ
Victory Bridge	NJ
Fulton Street Bridge	OH
I-270 SR 161	OH
Intersection of SR266 & SR513	OH
Kentucky 22 over KY River	OH
Maumee River Crossing	OH
Allegheny River Bridge	PA
Denbo (Mon Fayette) Bridge	PA
Susquehanna Bridge	PA
Highway 133 & 87 Intersection	SC
Carbon Plant Road over IH 37	TX